Better Crops

The Pocket Book of Agriculture.

April 1925 — 10 Cents

The Farmer's Springtime Outlook by E. G. Nourse—Articles by E. M. Harmon—Albert Hansen—E. W. Howe

The profit start

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Better Crops

The Pocket Book of Agriculture

VOLUME IV NUMBER TWO

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The first breath of Spring

Better Crops

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¶In which Jeff gives us a whiff of his sustaining and livable philosophy.

CREDO OMELETUS

By Jeff McDermid

WELL, Esmeralda, I have been accused—of being a philosopher! In fact my accuser says I am a "Stubblefield Philosopher."

And, as they say in the Common Garden Variety of after dinner speeches, "That reminds me of a story." A man rushed up to another at a busy street intersection, poked him in the nose, hewed him down to the asphalt with vicious chopping punches, tromped on his features and otherwise ruined him. As the bystanders pulled him off his victim a belated cop pried his way through the excited, seething swarm of wondering onlookers and took charge.

"Why did you hit this man," bellowed John Law.

"He called me an Ornithorhynchus!"

"When?"

"A month ago!"

"What! Why did you wait 'til now to smite him?" asked the astonished cop.

"Because I just came from the Zoo, where I saw an Ornithorhynchus!"

SO just here, in order that we may understand whether my accuser has complimented, teased, maligned or insulted me, a defini-

tion is in order of what manner of being a philosopher might be.

A philosopher is one who philosophizes. And to philosophize is to be philosophical; while Webster says that to be philosophical means to be rational, wise and temperate.

But there *are* philosophers. Therefore the definition is wrong. I will give you a new one.

A philosopher is a man who prepped at the Tough Breaks School, who is a Graduate of the University of Hard Knocks, and who, with diploma in hand, has transacted business, hated, loved, cheated, turned honest, looked at pictures, sang, got religion, lost it, pulled political wires, made money, lost it, trusted men, got stung, given up, started again, failed, arisen, preached, laughed—and who, out of a chaotic, busy life has woven from its strands a *Credo of Living* that fits him and his experience,—a *Credo* that is no earthly good to anyone else.

So that is a philosopher. And, ergo, you are one; and my accuser has complimented me, albeit unwittingly or unknowingly.

PHILOSOPHY is the art of knowing that all is in a state of flux—that when a thing freezes into rigidity it is no longer interesting, beautiful nor useful. When a feeling, whether of ecstasy or fear, can be reduced to a formula, it ceases to be a feeling and is a *corpse undelectable.*

A philosopher dare have no airtight prejudices or convictions, for, as Nietzsche says, "convictions are prison."

Philosophers understand life. To understand life you must live—and to live you must work, laugh, love and play, according to your *Credo,* always reserving the interesting, unalienable and necessary right to change your *Credo* whenever it interferes with that insight which develops new understanding and perception.

Isn't that simple? Or is it?

Life is a struggle away from complexities toward simple understanding.

As we grow older we place less and less dependence upon books, words, prayer, formulae and inanimate things; but love, men, friendship and Nature mean more to us.

I LEARN, through living, that laws and texts are often false, that crime not always leads to punishment, virtue to happiness, nor work to riches. I discover that life is a series of days that bring what they will, willy-nilly. And this being so I had best succumb, and suck my thumb of philosophy contentedly, peacefully and without fear.

The laws which inject happiness or misery into a life are not discoverable through a Newtonian Apple. Blessings and curses drift into days on the wings of chance—but this I know: that the active, busy man moves so swiftly that he dodges the most of the drops of misery and so survives.

I know that to help others is to help yourself, *only* if you carefully pick "the others;" that the world's prizes decay in the hand that grasps them, and yet are nonetheless worth grasping for; that a sincere desire to serve brings riches; that a greed for gold cheats the grabber and he grabs air.

I know that life is worth the living only with a goal, and that with the goal in sight life is not worth the living; that a prescription of love, laughter, song, study, play and sweat will make the sick well, the weak strong, the pessimistic optimistic, the cynical faith-full.

I know that I may trust men, not all men; and none too far; that to be busy is to be happy; that he who loves his work never works but always plays; that friendship is the touchstone of a drab existence which throws a mellow, golden

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How Successful Livestock Breeders Are Made

By J. L. Merritt
Clemsen College, South Carolina

The club boy of today is the breeder of tomorrow.

SUCCESSFUL livestock breeders are not found at every turn in the road, but Lancaster County, South Carolina, will certainly contribute its share of the "best breeders"—if the successful Calf Club Show held at Lancaster, S. C. last fall—means anything. Thirty farm lads—some of them only "little shavers"—fitted and showed 30 registered Jersey heifer calves, and what's more they showed them from start to finish in a way that would have been a credit to some of the "old heads" in the game. B. O. Williams, State Boys' Club Leader, says "it was one of the most outstanding pieces of club work ever done in South Carolina"; this statement is also backed up by Dan Lewis, Assistant State Boys' Club Leader, who was as happy and interested in the show as any of the farm lads.

County agent W. F. Howell, who believes that the "boy route" is the surest and "quickest route" to better dairying in his county, deserves much credit for this excellent undertaking. C. G. Cushman and W. J. Keegan, Extension Dairy Specialists, judged the calves and pronounced them among the best that they had ever seen in a calf show, not only of club work—but of any kind. Charles Oliver, of the American Jersey Cattle Club, was present for the club show, and said, "the event is of great significance to the dairy industry of Lancaster County." Mr. Oliver thinks that this show will certainly put the Palmetto State in the lead in calf club work.

"That the calf club boy of today is the breeder of tomorrow," was the impression left on the minds of the many interested people that saw the calf club show.

In commenting on the value of this show to the "farmers of tomorrow," Mr. Cushman says: "A boy and his calf are close rivals of a boy and his dog. Constant and jealous attention, much rubbing, brushing, polishing and friendly bantering not only reflected the boys' pride in their calves, but was of greater significance—for here were being developed not only great milk cows of tomorrow — but farmers of tomorrow with a true appreciation of livestock, its care and attention. All because a boy was given something of value, something alive and growing and to call his own, something which

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The Farmer's Springtime

Sunshine Overhead—

By E. G. Nourse
Institute of Economics, Washington, D. C.

THIS is a time of year when the farmer naturally looks at the business barometer and listens to economic weather prophets in the hope that he may get some guidance as to how to plan his year's business. Fortunately, there is much that is encouraging in the indications presented by the spring of 1925.

At the same time, it is well to remember that one must think not merely of conditions prevailing at the moment, but must also consider carefully the prospects for the rest of the season and even for the whole of a production cycle. No weather-wise farmer would think of knocking down all the hay in his fields just because the sun was shining brilliantly at nine or ten o'clock in the morning, while clouds lurked on the horizon. He would not expose himself to the chances of bad weather on more of the crop than he was reasonably sure of being able to take care of before such a change for the worse could overtake him. I am very much inclined to think that this is the present situation also with reference to the outlook for the business weather conditions that agriculture should prepare for in the not distant future.

Let us get the pleasing part of the picture before us first by considering the relatively favorable situation which agriculture enjoys at the moment. Our heavy crop carry-overs have been absorbed, surplus livestock has in the main been liquidated, and re-adjustments of production have taken place in many lines. At the end of the war, our producing machine was geared up to a capacity considerably in excess of normal peace-time demands. It happened also that from 1919 through 1923 general weather conditions were more than ordinarily favorable, and hence the farmer's labors produced a more than average return. During these years, therefore, our farmers experienced great difficulty in getting their production adjusted to the consuming power of the market and, at the same time, European nations were quite unable to bring their purchasing power back to the 1913 level.

It is a matter of common knowledge that 1924 weather slowed down this rate of agricultural production, and that meanwhile the consuming market was making progress toward regaining its pre-war absorptive power. The present winter has seen most of the burdensome surpluses wiped out, and for the first time since 1913 we enter the year's business on the basis of an

Outlook

Clouds on the Horizon

¶A keen and unflinching survey of the agricultural situation by one of the foremost economists of the country.

"even start." Of course, such a statement does not apply equally to all commodities. The position is relatively strong in wool and wheat and corn. It is just gaining strength with respect to hogs. It is rather weak in the case of tobacco, dairy products, potatoes, grapefruit, and some minor items. The cattleman has complained of his continued misfortunes and, even though substantial liquidation has brought some improvement, he is by no means yet in a satisfactory situation.

OBVIOUSLY, the actual course of prices during the coming year will depend more upon growing conditions than upon any other single factor. No guess as to what these conditions may be can possibly be hazarded so early in the season. We do know, however, in a general way that the higher prices of this winter tend to check acreage reduction programs and even to show a measurable increase in several significant directions. The Kentucky tobacco producers talked of a cut-out of the crop. This did not materialize, and a year of ample production would put them in a very weak, not to say dangerous strategic position. Cotton production prospects point to a crop somewhat smaller than last year, and this should assure fairly good prices if the current revival in the European textile trade is maintained.

Since world wheat surplus has now given place to something verging on shortage, anything but extraordinary growing conditions would seem to leave the wheat grower in a position at least nearly as favorable as this last season has been. The pork producer is certain to be prosperous under any ordinary set of conditions. Nothing but another short corn crop or a business depression could spoil the coming year for him. The dairy industry has had to absorb a good deal of productive effort turned to it from lines which have been less profitable during the last three years. It has hovered on the verge of a depressing surplus, but seems now to be in a fair way to hold its own if present high rates of consumption of both fluid milk and butter can be maintained.

THIS raises an "if" which unfortunately must be constantly kept within the farmer's range of vision. We must not fail to realize that such moderate prosperity as

agriculture is now enjoying depends upon a certain strengthening of the European situation, combined with an extremely favorable domestic market condition. While there are no clear evidences of any immediate slackening of industrial activity in the United States or prospects of widespread unemployment or falling wages, it is a certainty that, should such conditions develop even in moderate degree, they would seriously threaten the farmer's present improving situation. Only a home population fully employed at high wages could maintain the consumption of beef, butter, fruit, out-of-season vegetables, fluid milk, and tobacco, which is just barely spelling the return of moderate prosperity to our agriculture. The items listed all fall on the edge of the luxury class, and their consumption is sure to be sharply curtailed when consumers are forced to count their pennies.

And yet it is almost certain that some slackening in business activity will develop before any great length of time has passed. Business does not always move at full speed, and there are at least two particular considerations which forecast a slowing down from the high pace which we have been maintaining. One is the general "catching up" process. The housing shortage of which we have heard so much has now largely been met. Railroads are in good repair, and have met the most pressing needs for extensions and betterments. The feverish good roads campaign is meeting a setback from the economy and tax-reduction program universally agitated and to some extent practised by legislators and executives, from President Coolidge down.

THE present writer is by no means so foolhardy as to prophesy definitely that these influences will mean a serious falling off in the market for our industrial products during the present year or early in 1926. But he does insist that a wise agricultural industry will keep constantly scanning the horizon to note the gathering of such clouds somewhat in advance of the actual storm, and to order its own business operations conservatively in the light of all such possibilities. He might ask himself why the very optimistic business talk and stock market boom that was launched last November seems to be flattening out this spring.

Furthermore, there is a second reason for caution. We should not let the moment's enthusiasm over European improvement run away with us. It is true, of course, that there has been substantial progress toward settlement of the most acute European problems. But it is true also that there has been added to this a more or less artificial stimulus resulting from the resumption of leading operations by the United States to Europe in the form both of bond flotations and commercial credit accounts. Naturally there has likewise been something of a sentimental uplift coming from the mere expectation that the Dawes plan has really solved the problem.

However, it still remains to be seen how rapidly and in how large volume the European countries can restore domestic production and international trade upon anything like the basis which existed before the war. If they do not succeed in doing this, their power to purchase our products, agricultural and otherwise, will be proportionately checked. On the other hand, if they do succeed in re-establishing themselves quite completely in the markets of the world, they will become keener competitors of our own manufacturers and export trade. Hence, it cannot be too strongly emphasized that, even in the happier situation of today, there are distinct limitations upon the world's capacity to buy American farm products at prices which

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(How can we make spraying more effective? Here is good dope from an expert on

Some Factors Responsible for Spraying Failures

By C. E. Baker
Purdue University Agricultural Experiment Station

THE orchardist's troubles are many. In this respect at least, he is like all other tillers of the soil. His constant fight against the enemies that would destroy his crop and his ever watchful vigilance against new, unknown foes give him a well deserved place among the modern pioneers. Just as the battle seems to be about won, his own weapons of defense and attack sometimes apparently fail to function.

Spraying is the orchardist's chief means of resisting the attacks of insects and fungous disease, and when spraying fails, the results are disastrous. While it must be understood in the beginning that spraying is not often 100% efficient, it can usually be depended upon to effect a highly satisfactory control, when its application is thorough, timely and of the proper material to combat the pest for which it is applied. There is no cure-all, there is no spray that will perform its duty when carelessly applied, and there is a right time for applying each particular spray.

Any spray, therefore, to be effective must be applied at the right time. Spray schedule for all fruits are prepared by Experiment Stations for their respective states and these should be carefully followed. Much time and energy has been expended on their preparation. They are not merely written by some one who sits at a desk, and writes them to pass away the time. They have been perfected from years of study in the field, by the past experience of success and failure and by a study of the life history of the pests against which they are directed.

In order to plan an effective spray schedule, the writer must necessarily be familiar with every phase of the life history of the disease and insect enemies. He must know at which stage in its life history the pest is most susceptible to control measures. For instance, it is a waste of time and expensive material to spray for apple aphis after their injury has become severe enough to be noticed. By this time they are protected beneath the curled leaves where it is difficult to reach them with spray material or, as is the case with the grain aphis which attack the apple, their work on the apple is done and they have migrated to other crops. The

time to kill them is early in the spring, as soon as they hatch. Each pest has some vulnerable point in its life cycle at which it may be most easily exterminated. Treatment at any other time may be useless.

The successful grower knows these things and follows the spray schedules. He knows that the reason that the schedule says to apply the first codling moth spray after the petals fall but before the calyx lobes close, is that some 90% or more of the first brood codling moth worms attempt to enter the apple through the blossom end. By thoroughly spraying the fruit clusters with an arsenical, the poison is retained when the calyx lobes close, thereby keeping the poison where it is ready for the worm to feed upon and be killed before he has an opportunity to ruin the apple.

And yet there is considerable carelessness regarding the time of application — and consequently many failures due primarily to this cause.

The improper mixing and dilution of sprays is another contributing factor to spraying failures. It is impossible to consider here the manner in which the different sprays should be prepared, but the information is readily available for those who wish to follow it.

Too many times the use of the hydrometer is omitted in preparing lime-sulfur sprays of various dilutions. It is true that this takes a little time and is a little inconvenient, but it may save trouble in the form of injury from too strong solutions or poor control due to their being too weak. It is usually sufficient to test each barrel of concentrate and then figure the amount required for any dilution from a lime-sulfur dilution table which any Experiment Station will be glad to furnish.

The violations of proper methods of preparing spray materials are numerous, but they are all based upon carelessness and consequently subject to correction.

Hand in hand with the proper

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A barrel outfit is sufficient for a few trees or a small young orchard, but an orchard of more than 100 bearing trees requires a power sprayer for greatest efficiency. (*Courtesy Purdue Exp. Sta.*)

The Place of LEGUMES *on the* Dairy Farm

By E. M. *Harmon*
University of Missouri

¶How to gear up production in the cow factory for greater profits.

DAIRY production has been increasing very rapidly during the past few years. This is true not only in the Corn Belt but throughout the United States and many foreign countries. With this rapid increase in production, it is probably well to hesitate and survey the dairy situation as well as its future possibilities.

We find first that consumption of dairy products has kept pace with production surprisingly well. In the last twenty-four years the annual consumption of milk has increased in the United States from twenty-two to fifty-three gallons per capita with a similar increase in the consumption of other dairy products. In fact, at no time has there been a real surplus till this year. We entered this winter with over 50,000,000 pounds of surplus butter in storage—probably due mainly to a poor ice cream season last year which diverted millions of pounds of milk from ice cream plants into our butter factories.

This excess of storage butter is having the immediate effect of holding down butter fat prices. In fact, there is every probability that it will take an entire season of low butter fat prices to keep butter prices low enough so that the consumers will absorb the surplus. Such a condition coming right in the face of rapidly increasing feed prices can mean but one thing and that one thing is that the dairyman who is to make a profit during the next year must study his production costs. It is always true that the dairyman who so balances his farming operations to produce at least cost, makes the most profit, but during the coming year he is likely to be the *only* one who will make any real profit at all.

When we study production costs, we find that it is only the comparatively high producing cow that produces economically. Our average Missouri cow is credited by the U. S. Department of Agriculture with 120 pounds of butter in a year. In 1923, in Missouri, cow testing associations found that those cows which averaged 120 pounds of butter produced that butterfat at a cost of 41 cents per pound or more than the average price.* On the

*These costs of production figures are obtained by first allowing 40 cents per hundred pounds for skim milk and considering feed cost as half of the cost of producing butterfat. While subject to some question as to absolute accuracy they are equally fair to the high and the low producing cow.

other hand, those cows which averaged 300 pounds of butterfat in the same herds, produced it at a cost of only 19 cents a pound, leaving their owners a handsome profit.

It is evident from this that one class of dairymen will make a good profit while another class will be losing a great deal of money on the same market. How to make all of our dairying profitable is the all important question.

THERE are different phases of this problem not the least of which is that of getting rid of those inferior cows which are not capable of making a profit. And right along with this is the fact that about five-sixths of our dairy bulls are scrubs or grades. Year after year they are siring crops of daughters who, like their ancestors, will be unprofitable and will do their part toward robbing the dairyman of the profits he should be keeping for himself. The problem of the scrub is a serious one.

But some cows are unprofitable not through any natural tendencies on their own part but because of the fact that they are given "scrub" feeds and "scrub" care. A cow must have feeds and the right kinds of feeds to produce milk profitably. This problem is fully as important as that of better breeding. Furthermore this matter of feeding for profitable production is one that any dairyman can handle immediately while it will take him years to breed up a good herd. Any man in the corn belt can so arrange his cropping system as to raise most of the feeds necessary to produce milk at a profit. As a matter of fact, under our present methods of feeding the average cow does not have a chance to make her owner a profit because she does not get the feeds necessary for economical milk and butterfat production.

A cow is a factory. She is able to consume feeds of the right kind and transform them into milk and butterfat. If an automobile manufacturer starts out to make automobiles, he considers the kinds of materials he will need and then assembles them in just the proper proportions. He doesn't buy a lot of materials which he could not use in automobile manufacture. Neither does he get a surplus of one kind of materials and get his different kind of supplies out of balance, thus increasing his production costs.

In the same way the dairyman should consider the needs of his factory — the cow — and what materials are needed for milk production. Some feeds satisfy one demand and some another. On the other hand, some feeds have very little value as milk producers. It is up to the dairyman, if he desires to make the most profit, to find out just what feeds are needed and in what proportions. Then he should plan his cropping system, as nearly as possible to provide the proper amount of the different kinds o feeds needed.

WHEN we study the composition of milk we find that it contains four general kinds of constituents. These are water, mineral (mostly lime) protein, and carbohydrates or fats. Some feeds contain large amounts of one or two of these constituents but very little of the other. If we grow only the kinds of feeds that are rich in one of these constituents and fail to provide the other requirements, the cow's production will be limited because we do not have the proper balance in the ration. In such cases much of our feed is wasted.

Water, the first constituent, is more important than we usually realize. Ordinary milk is 87% water. A cow giving three gallons of milk a day must have fifteen gallons of water daily and she needs three additional gallons of water for each extra gallon of milk produced.

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Feeding *the* Bean Crop

By H. E. *Young*

¶What one bean grower learned about plant foods.

THE bean growers of Michigan produce about two-thirds of the white bean output of the entire country. The crop is grown more or less generally as a cash crop, and is one upon which many farmers are dependent for a large part of their annual income. As a farm crop beans usually prove very profitable, provided a satisfactory yield is secured. Market conditions are as a rule fairly satisfactory, and in many seasons the demand and prices are such as to give profitable returns even though production is below average.

As with all farm crops, the extent of profit to be realized in the production of beans depends very largely upon the yield per acre. Growers are therefore highly interested in production methods. In the case of beans, too, high yields make low cost. The use of barnyard manures and commercial fertilizers are important factors in the production of this crop. Bean growers have been using the former for years, and with good results, but the latter are not as yet in such common use. The application of fertilizers is a matter in which bean growers are generally interested and it is a question of importance to all farmers. Experience in their use offers the best guide as to the benefits to be gained from the commercial manures.

SOME farmers have tried them and can testify to their effectiveness. Such a man is Mr. S. J. Hanna, of Mason, Michigan. Beans are a regular farm crop with Mr. Hanna. His soil is a sandy loam. In order to thoroughly test the value of commercial fertilizer with this crop he tried it out under average field conditions. This is the kind of experience which counts and is of the greatest value from the standpoint of the practical farmer.

Mr. Hanna followed a crop of rye with beans. After preparing the soil thoroughly, he applied to a part of the field 1,000 pounds of a complete fertilizer analyzing 2% nitrogen, 7% phosphoric acid and 10% potash. Another portion of the field was treated alike except that the fertilizer mixture lacked potash. A third portion of the field was left without fertilizer as a check against the other two. The fertilizers were applied about the middle of June, and the crop was planted two weeks later. The season proved very unfavorable, and the beans blighted to a certain extent. The results at harvest were as follows:

Where no fertilizer was used the yield of beans was 5 bushels per acre. On the land treated with the complete mixture, containing nitrogen, phosphoric acid and potash, the yield was 22.7 bushels per acre, or an increase of 17.7 bushels per acre, over the unfertilized. On the soil receiving nitrogen and phosphoric acid, but no potash, the yield was 13.3 bushels per acre, or an

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Welcome, Mr. Dunlap!

By *Ted Butlar*

BETTER CROPS' Washington Correspondent

¶The new Assistant Secretary of Agriculture is a real food authority.

A MAN who has been vitally interested in food from the time it was produced until offered to the consuming public has been appointed by President Coolidge as aid to Secretary Jardine. The new Assistant Secretary of Agriculture, second in command of the Federal Department of Agriculture, is Renick W. Dunlap of Ohio, lifetime farmer and for a number of years Dairy and Food Commissioner of his state. He has been a producer of good food and in his official position has vigorously administered laws in seeing that nothing but pure and unadulterated products were permitted to enter the channels of commerce. He has been actively interested in both ends of the business of agriculture.

Selection of Renick Dunlap for his new position entrusts the U. S. D. A. in the care of two farmers. Both Jardine and Dunlap come from a long line of farmers and both of them have been active farmers for a long number of years. But that is hardly sufficient. It takes more than farming experience to run the Department of Agriculture as it is now constituted. Both men are executives. Jardine was president of one of the country's leading agricultural institutions before taking his new post and as head of the Kansas school he won a national reputation as an executive. Dunlap has won his spurs as an executive through successful experience in large farming operations and as the state dairy and food commissioner in Ohio. Still that is not all sufficient. Both men are fighters. As a diminutive star on a Utah football team in the early day Jardine won a reputation for crossing goal lines which lives to this day in the mountain district. He carried this same fighting spirit to Kansas where he put across a real agricultural program. As a member of the University of Ohio football eleven while in school Dunlap was star left end and captain during his senior year. He, too, carried the same fighting spirit into his life's work with success. They are both farmers, executives and fighters. That completes the picture.

NELSON J. DUNLAP, father of the new Assistant Secretary, began farming on one of the farms he now owns and operates, soon after his return from the Civil War and is known as the best farmer in Pickaway County, Ohio. He now owns more than one thousand acres of excellent farming land, which is in addition to three fine farms he has given his children—all of which he acquired from profits derived from the soil. His style of farming has been the successful combination of grain and livestock.

All of Mr. Dunlap's ancestors, his

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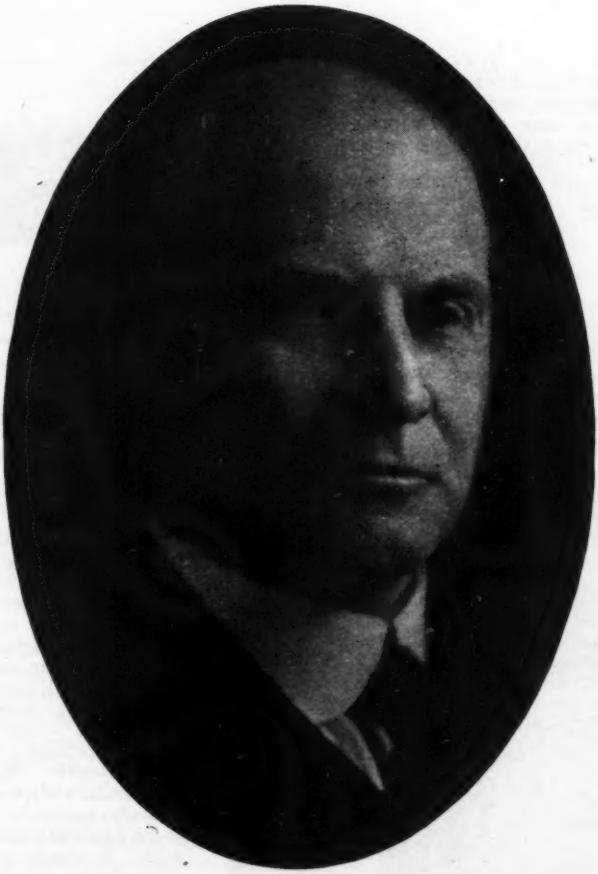
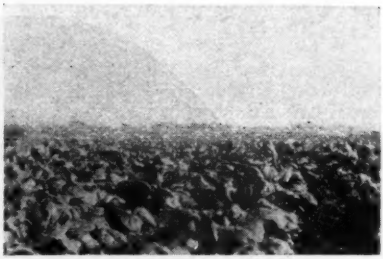
Better Crops' ART GALLERY of the month



Renick W. Dunlap, the new Assistant Secretary of Agriculture.
His story is given on the opposite page.

How Mr. H. L. Haeh of Coyotte, California, discovered the missing plant food in his soil. At left a spinach bed where no plant food was used.



At right a spinach bed on plot where brush had been burned. Both plots planted at same time. This comparison shows the need for potash on this soil.

Alvin T. Staser, Princeton, Indiana, winner of the live-stock judging contest in the eight weeks winter course at Purdue University. He made 358 points out of a possible 400 in judging horses, beef cattle, sheep and hogs. This is the 16th annual live-stock judging contest for eight weeks winter course students specializing in Animal Husbandry. This course is particularly adapted to the man who expects to go back to the farm and produce live-stock. In almost every instance the winter course man is leader in his community.

Concentrated Fertilizers for Economy

By *John A. Crawford*

¶ The effect of high analysis fertilizers on various crops as tested by the Massachusetts Agricultural Experiment Station.

CONCENTRATED mixed fertilizers appearing on the market a year ago with twice as much plant food as the ordinary preparation could boast, again brought up the question, "Do high analysis fertilizers burn the seed or injure the plant?"

For some years, the Massachusetts and other agricultural experiment stations had recommended concentrated mixtures, having found the low analysis combinations were comparatively uneconomical. War production had given weight to this advice, and the campaign in 1919 by the Soil Improvement Committee of the National Fertilizer Association had given impetus to their recommendations for greater use of it. Testimony in favor of richer chemical dressings thus had found its way to the farmers, and since then the proportion of high analysis fertilizers in the nation's consumption has substantially increased. Massachusetts farmers have been among those to accept the advice, and the proportionate use of high-and-low-analysis fertilizers in this state has changed in the past five years as shown in table below.

The query "Do concentrated fertilizers injure crops?" has, nevertheless, persisted, and the Massachusetts Agricultural Experiment Station at Amherst concluded it would reply to doubting Thomases with evidence to be gained from crops of tobacco, sweet corn, potatoes, beets and hay that they would grow with concentrated complete fertilizers from the 1924 market on the one hand and with home mixtures of half that strength on the other.

They planned to treat two to five plots of each of these five crops,—excepting the hay, that ranged in size from a 9′ x 40′ area to a fifth of an acre of well-drained,

Grade	1920	1921	1922	1923	1924
High-analysis	65% of total	73	84	87	89
Low-analysis	35	27	16	13	11

fine, sandy loam on the Station lands, in these two fashions, and they selected their concentrated and common fertilizers for use in the following amounts and ratios:

season's observations on the stands were summarized.

The young tobacco plants betrayed no more injury from concentrated fertilizers than from the

Crop	Approximate Grade and Ratio of Plant Food	Pounds of Fertilizer Used Per Acre†	
		Normal Mixture	Concentrated Mixture
Tobacco	5–4– 5*	3,000	1,500
Sweet Corn	4–8– 4	2,000	1,000
Potatoes (late)	4–6–10	2,000	1,000
‡Beets	4–6–10	1,000	500
Hay	9–8– 0§	(a)300	136.3
		(b)...	272.6

*Figures refer to percentages of NH_3, P_2O_5, and K_2O, respectively, in normal mixtures.
†Furnishing chemically equivalent plant food in normal and concentrated mixtures.
‡Included four varieties of mangels and one of sugar beets.
§A mixture of 150 pounds of sodium nitrate and 150 pounds acid phosphate, a concentrated ammoniate.

THE fertilizers were applied in varying manners. On one plot of each crop, the concentrated ones were drilled in the row and stirred well with the soil before the planting, the tobacco lands, where both the ordinary and concentrated mixtures were spread broadcast, being an exception. A chemically equivalent amount of an ordinary mixture was drilled into the rows of certain plots and stirred well with the soil. On a third set, concentrated fertilizer was sowed broadcast and raked in.

The experimenters desired conclusive evidence about burning. The tests had to be severe. The fertilizers, containing 28 to 40 per cent plant food, were applied close to the seed. Later Nature intensified the experiment by sending only 8.35 inches of rainfall instead of the 25 year average of 15.47, between May 1 and September 1, the most active growing period. Much moisture would have lessened the danger of burning.

All through the summer, these plots were scrutinized, and the stand counted from time to time, and finally each yield, except the hay crop, was weighed and the ordinary mixtures, as the normal amount of resetting had been done on both plots. The stands of sweet corn and potatoes had suffered a slight injurious effect, especially where the fertilizer had been drilled in the row. The beet and hay stands were uninjured.

THE yields under these different treatments did not vary greatly, but if any significance is allowed to the variation, says Prof. A. B. Beaumont, who directed the study, it will favor the use of concentrated fertilizers over ordinary mixtures. Though in two of the five plots there was a slight reduction of stand where the concentrated fertilizers were applied,— more especially where drilled in the row, but to some extent where it had been sown broadcast,—there was no reduction in the yield of the crop. The yields ran as shown in table on page 47.

Greenhouse tests that compared the concentrated with low-analysis fertilizers added another bit of evidence about conditions under which burning does not result from the use of the more powerful fertil-

(*turn to page 47*)

Watch Out

By E. W. Howe

HERETOFORE public prosecutors, in making preparations for the fall elections, have attacked the railroads, street railways, gas companies, electric companies or other utilities. But lately, the poor old utilities having been sufficiently hammered, a bright fellow out West has thought out a new scheme; he has jumped the county officials and with surprising results. The taxpayers are crazy about him, as he has unearthed tremendous frauds.

There is a suggestion in this western incident for public prosecutors everywhere. We have squeezed most of the water out of the public utilities; but what has been going on behind the scenes in court houses, city halls, at meetings of school directors? What have road overseers been doing during these recent days of tremendous extravagance? Has cheating been going on there also?

How about the stores where you buy supplies? The offices where you seek advice? How about the committee men asking a donation? Are they asking too much? The only safe rule is to watch everybody: the man who is honest may be careless, or so dull that crooked associates easily lead him astray. The public corporations are so closely watched that they have become rather honest.

The man or institution most closely watched is the most honorable: many a man is saved from being a thief by finding a policeman or neighbor on guard when he feels a disposition to go astray. Watch everything as closely as you watch the public utilities. I am not above suspicion; you are not. And I am as certain about you as I am about myself. "Watch Out" is good gospel.

And while about it, watch yourself. Men originate their own troubles. You can get rid of most of yours by going over your faults candidly, and remedying the more serious ones. I am an old fellow, and have been through the mill rather thoroughly. I have concluded the people themselves are to blame for the wrongs they complain of so bitterly. Suppose we try the plan of everyone doing a little better. That may bring the relief we need so much. And our first reform should be to watch ourselves carefully to see that we are as honest, efficient, polite, healthy, industrious and helpful as one should be.

¶A well-known plant pathologist writes about

Plant Food *and its* Effect *on* Diseases

By C. T. Gregory
Purdue University Agricultural Experiment Station

"IF there was only something that could be added to the soil to prevent those plants from dying. I have often thought that perhaps there is something like lime or a fertilizer which could be used on my cabbage to keep it from turning yellow and dying." So spoke Jacob Goepper, a market gardener and he was unconsciously voicing the belief and desires of scores of other gardeners and farmers. They feel that something is needed to add to the soil to prevent all diseases and fertilizer is the first thing they think of applying.

It is an old and well established thought that vigorous plants are most resistant to diseases, hence the belief that fertilizers must help in controlling disease. However, the question of plant vigor and its corollory, the relation of fertilizers to plant diseases, is not a simple matter. Certain diseases, like the rusts, actually thrive better on vigorous, well fertilized plants than on weak plants. On the other hand there are diseases that can only attack weak plants. So while in most cases fertilizers are of great benefit there are instances when the one or other ingredient or combination of fertilizer constituents may further the development of certain diseases and aggravate the crop injury.

It is claimed that the use of nitrate fertilizers will control the bacterial spot of peaches since the trees are made more vigorous and can better withstand the attacks of the bacteria. Such treatment should necessarily be accompanied by other cultural practices which will keep the trees in vigorous growing condition. The yellow berry disease of wheat in Colorado is claimed by Headley to be the result of an improper nitrogen-potash ratio in the soil. Nitrates will correct this trouble but the application of this fertilizer must not be over done because it will cause the grain to be shriveled.

ATTEMPTS to reduce the ravages of the black stem rust of wheat by the use of fertilizers have not always been attended with much success. A careful study of this question was made in Minnesota by Stakman and Aamodt who found that in certain cases the amount of injury caused by the stem rust may be reduced by the use of phosphate and potash. Oddly enough, however, the actual amount of rust is not affected. Their explanation is that these two fertilizers increase the stiffness of the straw, preventing the lodging of the grain, and also promote the early maturity of the crop. In other words the length of the growing period is cut short a week or more, thus reducing the time

that the wheat is exposed to the rust, since after the maturity of the wheat rust can no longer do any harm. This beneficial action was much more marked in soil deficient in phosphate and potash. These same experiments proved that nitrates had the opposite effect, lengthening the growing period of the wheat and thereby increasing the rust damage.

It is well known that pear trees are much more susceptible to the fire blight if they are forced into a rapid growth by any means, including the use of nitrates. Moreover, the use of nitrate fertilizers, if applied late in the season, will usually cause a late soft growth which winter kills very easily. In general, nitrate fertilizers are prone to increase the susceptibility of plants to disease. Butler states that potatoes are rendered more subject to late blight, grapes to the gray rot disease, mangolds to rust and various plants to the mildews.

POTASH fertilizers have a reputation of increasing the natural resistance of plants to diseases and this is certainly borne out in many instances. Lutman and Cunningham claim that among other things potash salts decrease the scab of potatoes. Hoffer has shown that potash and phosphate will largely prevent the iron and aluminium accumulations in the nodes of the corn. Tobacco responds rather quickly to a deficiency in potash by a crinkling or curling of the leaves which are also overcast with a bronze or copper hue. This condition is called potash hunger. Cotton rust is also said to be due to potash hunger. Butler has made observations on the effects of potash on several diseases. The rust and mildew of wheat were less severe when the plants were sufficiently supplied with potash, though no amount of this plant food could overcome the susceptibility induced by nitrogen. He states that in greenhouses diseases of tomatoes could be checked by the use of potash, but he does not mention the exact diseases in question.

Other substances have also been found to be active in their effects on diseases. Lime, wood ashes and fresh horse manure are known to increase the amount of scab on potatoes. Wheeler states that ammonium sulfate will aid in reducing scab by its tendency to sour the soil. The root rot disease of tobacco is also favored by an alkaline or "sweet" condition of the soil. Club root of cabbage, on the other hand, can be prevented by the use of heavy applications of lime to the soil. The sand drown disease of tobacco, as it is called, is an uneven yellowing of the leaves and oddly enough it has been found to be the result of a deficiency in magnesium. Only small amounts of this substance are needed to correct this trouble. Sulfate of potash magnesia is usually recommended where sand drown threatens to infest the crop. Another tobacco trouble, known as frenching, is thought to be the result of improper balance of food substances in the soil, but the exact relation has not been worked out.

The plant's diet of fertilizer is an important factor in disease control. Not only must there be plenty of food present in the soil but it should also be in well balanced proportions. A strong, vigorous plant is usually most resistant to diseases but merely because a plant is making a heavy, succulent growth is no proof of its vigor. The most vigorous plant may not make the most rapid growth. From the plant disease point of view the well balanced fertilizer is most important and, moreover, the fertilizer must be made to fit the needs of the soil. For some soils a well balanced fertilizer may only be potash or phosphate, while others may need only nitrogen.

The Relation of SULFUR to Soil Fertility

PART TWO

Effects of Sulfur Under Semi-Arid Conditions

By Dr. Robert Stewart

University of Nevada

THE relation of sulfur to soil fertility in a semi-arid region is very different from that existing under humid conditions. The soil in a semi-arid region has been formed by the processes of physical disintegration rather than those of chemical decomposition which prevailed in a humid area.

The soil of a semi-arid region, therefore, retains more nearly the composition of the original rock material out of which it was formed. Many of the most important agricultural soils in a semi-arid region have been derived from the weathering of the sedimentary deposits of ancient saline seas and lakes. The original soil material is therefore heavily impregnated with soluble salts or alkali. The limited rainfall of a semi-arid region has not been sufficient to leach out the soluble salts to any appreciable extent and they have accumulated in the soil. Under cultivation and irrigation these salts frequently accumulate by seepage and concentration in certain areas so as to cause considerable difficulty to the farmer from alkali accumulations.

The composition of the alkali varies, of course, depending upon its location and origin. Almost invariably, however, sulfates of calcium, magnesium or sodium are present in excess. The presence of these sulfates in many irrigated soils and the possibility of the addition of sulfates in quantity in the irrigation water modifies in a very material way the requirements of crop plants for sulfur under semi-arid conditions.

On the other hand the absence of large industrial centers, limited coal consumption, small rainfall and vast open spaces decreases in a very material way the possibility of any appreciable quantity of sulfur being added from the atmosphere by the precipitations.

THERE are in certain regions special types of soils derived from volcanic material of a basaltic rock which do not have these alkali accumulations and which have been found to respond in a most remarkable way to applications of sulfur bearing materials.

Such soils are found in Oregon, Washington and Idaho.

Powers of the Oregon Agricultural College believes that there are at least 100,000 acres of soils of this kind in Oregon largely devoted to alfalfa production which would be materially benefited by sulfur fertilization.

Experimental work has been carried on in Washington, Oregon and Idaho regarding the effect of sulfur on crop production and some really interesting and significant results have been obtained.

In Oregon the experimental work has been in process since 1912. The early work was carried on in a desultory way and the results obtained are only indications of the sulfur possibilities. In 1916-17-18 some results were obtained with adobe clay near Medford, Oregon which readily indicate the marked influence of sulfur bearing materials on the yields of alfalfa and are typical of a large amount of similar data now available.

there is something radically wrong with the productive qualities of the soil.

(2.) The application of rather large amounts of either of the accepted constituents of commercial fertilizers, nitrogen as sodium nitrate, potassium as muriate of potash and phosphorus as monocalcic phosphate have no appreciable effect on the yield of the alfalfa.

(3.) The application of materials containing sulfur in almost any conceivable form exerts a marked effect on the yield of the crop.

Eight different materials containing sulfur were used and the average yield from the soil receiving these materials was 5,056 pounds, while the untreated plots yield only 893 pounds. The application of 100 pounds of sulfur produced an increased yield of over two tons of alfalfa hay or 441 percent increase!

(4.) Magnesium sulfate, a common constituent of many alkal.

Treatments	Amount of Material Applied	Amount of Sulfur Present	Three Year Average Yields
None (ave. results of 3 concordant check plots)	0	0	893
Muriate of potash	540	0	1040
Nitrate of soda	558	0	1060
Monocalcic phosphate	316	0	953
Flowers of sulfur	100	100	4000
Gypsum	595	100	5470
Superphosfate	823	100	5493
Sulphate of potash	549	100	5093
Iron sulfate	869	100	5273
Magnesium sulfate	782	100	5513
Sulfate of ammonium	423	100	4893
Sodium sulfate	1093	100	4720

The effect of sulfur on olfalfa.
Application and results recorded as pounds per acre.

THESE results are truly remarkable. There are a number of significant points presented by the data.

(1.) The untreated soil is very unproductive. A yield of 893 pounds of alfalfa, less than one-half ton as an average for three years, indicates quite clearly that soils of the arid west, gave the largest increased yield. Sodium sulfates, the common alkali of alkali soils, gave an excellent increased yield. These two substances occur in an abundance in many of our irrigated alkali soils of the semi-arid west.

(*turn to page 41*)

The Editor's

GET OUT OF THE SQUIRREL CAGE!

How easy it is to become a slave to routine! We undertake a new job with tremendous energy and noble resolutions. As time goes on we get things organized. Then we should begin to reach out, to study and do research and open up new fields of work.

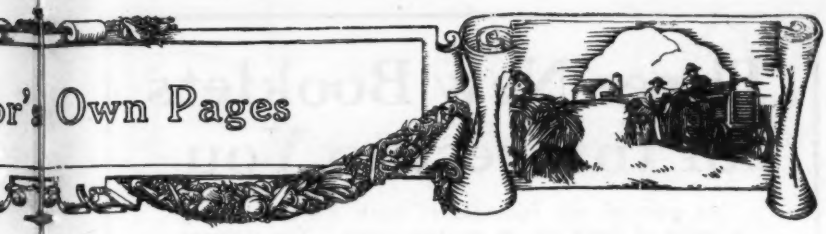
"Yes" we say "I mean to do it but, confound it, I've got so much on my mind now that I haven't got a minute to study." And so we find ourselves locked in the squirrel cage of routine, endlessly going over the same jobs in the same way.

It's a hard job to keep growing. It requires intellectual curiosity, a great amount of determination and a creative urge—and not many of us possess all these qualities.

One of the most commendable undertakings of the state and national county agent associations is their attempt to find a way by which county agents can continue study and research. I believe that some states have already made it possible for county agents to take a year off for post graduate work of the agricultural colleges. If this becomes a general practice I believe it will greatly increase the usefulness of county agent work.

I wish that farmers as well could be persuaded of the value of doing something of this kind. I know that many of them would think anyone crazy who suggested that they take six months or a year off occasionally to study their problems. Yet those farmers who do take time off for short courses at the agricultural colleges and for other kinds of study are the men who are making real progress.

To be sure, not everyone can lay aside his routine tasks and devote himself to uninterrupted study, whenever he



feels like it but everybody can set aside a little time for gathering new information.

The individual or organization which has lost the habit of studying, which hasn't any time to learn something new, has definitely assigned itself to the rearguard.

BEST WISHES!

In this connection I am glad to note that this summer there will be held during July and August at the University of Pennsylvania, a four weeks' conference on cooperation.

A number of the leading farmer organizations have formed the American Institute of Cooperation under whose auspices this conference will be held. A week's study and discussion will be devoted to each of the following topics: economic principles and legal structure of cooperation, organization and membership problems, operating methods and management problems, sales policies and price problems.

This is an ambitious undertaking. In view of the factions and rivalries that exist in the cooperative movement, it is a courageous undertaking. If the various groups interested in cooperation can be persuaded to put aside personal ends and study objectively and impartially the cooperative movement in its various aspects, this conference will be a memorable occasion. At any rate, it offers cooperatives a fine chance to get out of their squirrel cages.

BETTER CROPS wishes the Institute well. It promises much; it is founded on a sound ideal. Its work cannot be judged yet but we believe that every one should help, as far as he can, to make it fruitful.

Jeff McDermid

Three New Booklets of Interest to You

As part of our educational work we are issuing a series of booklets on various crops. The purpose of these booklets is to show by facts and figures how proper fertilization brings the farmer a greater income both through increased yield and improved quality.

Each booklet has been written by an authority in the field who is in touch with the latest reliable information on the subject. This information has been presented in a popular, readable form with numerous illustrations of actual results. The following booklets are now available for distribution.

BETTER TOBACCO: This is a new edition of the booklet that was in great demand last year. It has been completely revised to cover all types of tobacco and all tobacco growing districts in the country. It includes as well a valuable section on sand drown.

BETTER TRUCK CROPS: This 48-page booklet deals with the cultivation and fertilization of the principal truck crops. Each crop is treated separately and information on seeding, varieties and proper fertilization is given for each crop.

BETTER POTATOES: Methods of seeding, planting, cultivation and fertilization are discussed in this 48-page booklet. The various potato-growing regions of the country are treated separately making this an unusually comprehensive work.

Any or all of the above booklets will be sent free upon request to any reader of BETTER CROPS. If, after reading your copy, you desire more for educational work, we shall be glad to furnish them as long as our supply lasts.

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The Value of Maintaining Soil Fertility

By Harold M. Vaughn
County Agent, Manistee, Michigan

The third plank in Better Crops' *platform is "Maintain soil fertility," and this is the prize winning editorial on that subject.*

TWO questions of vital importance are continuously before the farmers of America. They are: What will bring about an increase in prosperity to our farms? The second is contingent upon the first: How will they get whatever it is they need for prosperity?

The answer to the first question is efficiency in production, whether the crop is cotton or corn or the 101 other crops. No cooperative or congressman can make a crop profitable unless it is produced profitably and economically. The idea of a "co-op" making 60 bushels of potatoes or 25 bushels of corn profitable by clever marketing is beyond the wildest dream of the most rabid "co-op" supporter.

Let's turn to the second question and find out, if possible, how to get what farmers need, which we have decided is efficiency of production. It is up to the man himself. The depletion of soil is the result of mismanagement by the farmer, rather than the fault of the soil itself, and it can be corrected. Efficient production can usually be assured only when the soil is new and productive or when its fertility has been maintained by sensible cropping practices.

Ask any of the older generation of farmers about crop production, 25 years ago and now. They will point out farm after farm which

used to produce big crops, which now show low yields or are abandoned entirely. Our average yields have steadily decreased and are a disgrace when compared with figures from many of the better individual farms. You may know, as I do, of farmers who are clearing a new small field of land for potatoes every year, or others who have cleared up and worn out every available foot of land and are now planting potatoes and beans along the road-side. Ten years ago, any man who did that would have been laughed at. Yet, today, many are doing it and we don't laugh. It would be more proper to cry over the tragedy of the destroyed acres and the lack of foresight. It is hardly less than a crime for one generation to destroy the means of livelihood of their children and grandchildren, handing down an old wornout thing in place of a productive farm. Yet we wonder why the sons and daughters leave the farm. Why shouldn't they? Who wouldn't leave a sinking ship unless she could be saved, and we may be sure there is no hope for agriculture under the old methods of soil robbing.

Instead, soil building is the solution, and fortunately this does not mean a large expensive outlay before any results are obtained.

Soil sweetening is usually the first step. You hear now and then a man who denies the truth of this fact but before you believe him, find out what his production has been during the past five years and don't be misled by tales of what he did years ago. After you have visited his farm, visit the farm of a consistent lime user and if you aren't convinced of the truth, quit farming—there's no hope for you in the field of agriculture.

With the sweet soil there will be the growing of soil building legumes. All legumes are good. Alfalfa and sweet clover are usually best. The proper methods of culture and rotation of these crops are essential to success, but that is another story. In most cases the application of commercial fertilizers and barnyard manure has been found essential to economic production at the very outset of establishing a rotation of this sort. Generally farmers will adopt this practice without any urging after seeing the benefits from soil sweetening.

There is probably no other project of soil fertility to which Agricultural Extension men in northern Michigan have devoted so much of their time, as lime and legumes. While the results have justified this expenditure of time, the fields are scarcely touched. To this end, we have exhausted almost every ingenious device excepting the passage of laws making it a criminal offense not to use lime. Lime in various forms has been placed almost at the individual farmers' front doors, yet comparatively few have taken advantage of their opportunities.

Let's pause a while and check up to see where lies the cause of all this tremendous inertia, towards progress. I am convinced that it lies with the men themselves who are farming. We have hundreds of them who have no interest in or respect for the qualities of their soil. They farm it because they have to. They do as little thinking or planning as they can. Time which could well be devoted to development is spent in damning the supposed causes of their misfortunes, the legislature, taxes, county agents and even neighbors and wife.

Here and there we find a different type of man. One who looks upon his land as something to be studied and understood, something to be fed and nourished, not to be cudgled into bringing forth a crop with its last dying effort. To the men who have this understanding of land, there is no soil problem. Their farms can be handed down to their sons and grandsons at a constantly increasing worth.

Soil fertility is one way to spell "success."

Some Other Angles on Soil Fertility

By *Sam D. Preston*
County Agent, Flint Hill, Virginia

(This contribution ran a close second for the prize and is well worth your consideration.

THIS value of maintaining soil fertility is indisputable. The farmer who plans systematically to leave his soil in as good, or even better condition when a crop is taken from it, as it was at seeding time, is usually a successful and happy man. He is the farmer who complains least about labor conditions and the prices he receives for his products. The farmer who takes good care of his land usually takes good care of his workers, furnishing them comfortable quarters and paying them a living wage. He also takes care of his livestock and everything about him.

A farmer said to me last spring, when others were complaining about help, "I have all the help I want. In fact I turned down some help yesterday." When asked how he accounted for this condition on his place he replied: "I give my help comfortable homes and good treatment." He also pays his men well and makes money for himself. This man could not afford to give comfortable homes and good salaries if he did not look after the fertility of his soil—and this he does well. He not only maintains the fertility of his soil, but he increases it up to certain profitable limits. The average yield of wheat for this section is ten bushels. This man makes from sixteen to twenty-two bushels. The average yield of corn is thirty-five bushels, but this soil builder gets from fifty to sixty-five. He usually tops the market with his fat steers. I was to see him a few days ago and he said that he had two car loads of cattle to go to market,—and they were fat too. It is a little late to be putting cattle on the market from this section, but this farmer, unlike Mr. Soil Robber, was able to hold his steers through the period of low prices and maintain weight. The poor soil manager must sell in order to make ends meet.

It is readily seen that when soil fertility is kept up to a point where production is almost double the average, the labor requirements are cut proportionately. It takes approximately the same labor to produce wheat at the rate of ten bushels per acre as it does to produce twenty bushels on the same area. The same thing is true of corn and other crops. Of course the expense is greater in the case of high yields, but up to certain limits it is not at all in proportion to the increased yields. Maintaining soil fertility not only increases yields, but improves quality which usually means larger returns. The consuming public is paying much more attention to quality now than ever before, hence the better the quality the greater the increase in revenues.

During apple packing season I visited the orchard of the farmer whose activities are mentioned

above. It was plain that his apples were larger and smoother than those in the neighboring orchards. When asked how he accounted for the difference he replied: "You see I cultivate a part of my orchard each year and seed it to some kind of legume. The part that I do not cultivate is given an application of nitrate of soda. In that way I keep the soil in good condition all the time." This man was proud of his orchard because he could see results in the size and quality of his apples; he was proud of it because he was able to pack a higher percentage of the fruit produced; and most of all he was proud of it because he was able to show larger returns per barrel than his neighbors who set out their trees and complained because nature would not do all the rest.

In the good old days that we read about there was a plenty of land and cheap labor. When one field became too poor to produce it was easy to move on to another. And too, poor land could be farmed with some profit because of the cheapness of labor. It is different now. Land is not so easily obtained; labor is no longer cheap and the farmer who tries to maintain bulk of production on poor land with high priced labor is doomed for the poor house. The farmer of today who is doing best is the one who maintains bulk of production on a smaller acreage and with less labor. This can only be done by maintaining soil fertility at the highest state of profitable production.

It is possible to be just as imprudent in the matter of increasing soil production as it is to allow land to depreciate. That is, it is possible to run the cost of soil improvement beyond the point where it is profitable. If the maximum profitable yield is twenty-five bushels of wheat per acre, that is the point of productivity at which the soil should be maintained.

To maintain or improve soil fertility, the farmer must know his soil; he must be interested in the project; and above all he must keep cost accounts, for they are the only true guide to success.

A close up of county agent J. R. Clark, of Columbia, South Carolina, showing a farmer the "why" of growing velvet beans in every other row of corn on light sandy soil.

By Ted Butlar

BETTER CROPS' Washington Correspondent

Two resignations of more than usual importance from the Federal Department of Agriculture have been announced since the last issue of BETTER CROPS. Dr. E. D. Ball, Director of Scientific Work since the position was created about three years ago, has tendered his resignation to Secretary Jardine. "The development of research work should progress rapidly," Dr. Ball said in making his wishes known to the agricultural chief. Chester Morrill, officer in charge of the Packers and Stockyards Administration since the Act was passed, resigned to accept a responsible position with the War Finance Corporation.

Even though the Federal Government keeps constant vigil at ports of entry to prevent introduction of insects and diseases which are doing millions of dollars damage annually to American agriculture, they continue to enter though not to the degree they did before quarantine restrictions were laid down. Just the other day a gentleman from East Africa stepped into the office of Dr. J. R. Mohler, chief of the Bureau of Animal Industry. After a journey of 9,000 miles this fellow had come to Washington with a sample of hog blood containing a disease much more deadly than hog cholera. He was looking for assistance in combating the scourge. Dr. Mohler, as soon as he could get his hands on the bottle, immediately took it upstairs and consigned it to the icinerator.

Less than a month ago a Swiss, armed with a bottle of attenuated virus of foot-and-mouth disease, came to Dr. Mohler's office with intentions of experimental work. Likewise, it was consigned to destruction. And the Swiss was told that if he wanted to experiment with a disease which had cost American livestock interests and the Federal Government millions of dollars he would have to select some other country for his workshop. Dr. Mohler recently issued a statement that there was reason to believe that the recent outbreak of European fowl pest was the result of introductions made by well-meaning scientists. At least the disease was first found in states where scientists had been working with the disease.

Dr. Mohler believes—and who could take issue with him—that studies of plant and animal disease should be made in countries where same are prevalent. With this belief in mind Dr. Mohler and his people went before Congress and were given $75,000 to carry on a study of foot-and-mouth disease in Europe. As soon as the funds had been made available Dr. P. K. Olitzsky of the Rockfeller Institute for Medical Research, Dr. Jacob Traum of the University of California and Dr. Harry W. Schoening of the Bureau of Animal Industry were named to proceed immediately to Berlin and other points to conduct a comprehensive investigation of the livestock scourge. Fond hopes are that new and scientific

means of combating the disease might ultimately be discovered to replace the slaughter method now in use.

Not all of Secretary Jardine's time is given to thinking about corn and credit, plows and prices. He is a great lover of flowers and contends that the American farmer has a genuine appreciation for esthetic beauty. "Plant life of the flower garden plays an important role in a satisfying rural life," he said in a recent speech. "The flower is the universal vehicle of expression whether it be of joy or sorrow. The flower is the common language of all peoples."

The enormity of expenditures for motor cars is shown by every subsequent report. Nearly $80,000,000 was collected from the motorists in the form of gasoline taxes in 1924, according to the Federal Bureau of Public Roads. Thirty-five of the 48 states and the District of Columbus imposed a tax, the rate ranging from one to three cents a gallon with the exception of Arkansas which levied a four-cent tax. Most of the money was spent for road construction or maintenance, say recent reports.

There is one motor vehicle for every 6.4 persons and one passenger car for every 7.3 persons, the Federal government has found in its study of the motor situation at the close of 1924. Motor vehicle registration in the country reached a total of 17,591,981, final figures show. The total gross receipts from license fees amounted to $225,492,000. What will we find in the next generation?

Representatives of European and American cotton associations recently met in Washington with Federal officials for the purpose of preparing 40 sets of the Universal Cotton Standards to be used in international cotton trade during the coming crop year. A number of these sets will be distributed among the various exchanges in foreign countries. All dealing in American cotton is done on the basis of these standards, which are guarded very carefully during all stages of preparation to guarantee their correctness.

Mary Elizabeth Skinner of Lafayette, Indiana, feeding an orphan lamb.

The Youngest Farmer

Virgil Schoepple of Berryville, Arkansas, is the youngest farmer in the United States.

He started farming when he was five years old. He is only six now. He is the youngest club member working in cooperation with the Extension Service, College of Agriculture, University of Arkansas.

Young Virgil started farming before he started to school.

He is the son of Mr. and Mrs. H. A. Schoepple. He shears his own sheep, feeds his own pigs, cares for his own chickens and makes his own garden.

He is a real truck farmer

Virgil is primarily a truck farmer. He has a garden all his own and does all the work in it except the plowing. All he wants is a little more time and he will take over that phase of the work. Virgil furnishes the table with beans, peas, sweet potatoes, cabbage and corn.

When beet canning time came he put up his own jar all by himself. He canned peas, soup mixture and tomatoes from his garden. These he displayed at the community fair along with his selected corn, his pigs and his chickens.

He has learned to milk and to separate the cream so that he may have milk for his pigs and kittens and the inevitable dog.

Last spring he grafted some buds on apple trees. Enough lived to show that young Virgil knew what he was doing.

This young farmer loves to play. He is just a boy like other boys and runs barefoot and hatless the sun glistening in his blond hair. He has learned many things already that are still unknown to many veteran farmers.

He started "play farming" and enjoyed it so much that he developed into America's youngest farmer.

It would be interesting to read a story about his agricultural accomplishments thirty years hence.

—Gus. M. Oehm.

Extra Value in Soy Beans

Out of any group of twenty farmers in Wright County, you will find from one to three who say soy beans won't furnish protein for the hogs because the hogs won't eat the beans. The remainder of the crowd, if they have had experience with soys, will disagree.

We'll agree that some hogs won't take readily to soy beans, neither

About Ourselves

BETTER CROPS is a monthly magazine edited primarily for those who act in an advisory capacity to the farmer.

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CHANGE IN ADDRESS — Readers should always give old as well as new address and allow at least three weeks for the change.

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THE PUBLICATION of an article over an author's name, pen name or initials does not necessarily imply that we endorse the opinions expressed therein. We print articles for their interest and merit regardless of whether they accord with our own opinions.

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will all men take to cooperative marketing; but both are here to stay and if we can't whip the farmer into line on the soy bean proposition in one way, possibly we can on another, and since soy beans are a comparatively new crop it's only logical that we should find new and important uses for them as time goes on.

We know that soys are a legume, that they store nitrogen from the air into the soil, but Henry Bruhl, southwest of Clarion in Wright County, Iowa, likes soy beans because of another quality they possess.

Last year Bruhl had a good field of sod corn. It sprouted good, came up good, and stayed good all season. Last fall he picked a good lot of corn from the field. Bruhl planted soys in every hill of his sod corn.

Near Bruhl's place there was another sod field, about the same condition, planted the same time. The kernels started out in good shape and the sprouts were cut back by the cut worms. The entire field was riddled; the crop turned out almost a complete failure. No soys were planted with the corn, and, while beans were dropped in every hill of Bruhl's field, there were only a few plants later in the season, for they, instead of the corn, bore the brunt of the cut worms' attack.

Bruhl's hogs like soy beans, but if their presence will insure a corn crop against the cut worms he's ready to put them in every year in every hill of sod ground, or on the other land since during the past few years all of the land has been more or less infested with cut worms.

Other men in the neighborhood have had similar experiences to Bruhl, and all are hailing the soy bean as the miracle crop. Certainly it has worked wonders with the cut worms in the way of making a good stand of corn.—*Paul C. Tomlinson, County Agent, Clarion, Ia.*

The Fortunate County Agent

Dear Jeff:—

To the county agent who does all his letter writing and filing usually after he gets home from his trips, it sure does make him feel sort of jealous to read about the county agent in Kansas who carefully looks over the farm papers, checks them and then turns them over to the stenographers.

He did not say how many were employed. They tabulate the articles on 4 x 6 cards which are filed alphabetically, and are then convenient for handy reference. This was copied from the February issue. Happy man! I am wondering how many of the 2,700 county agents are as well blessed. I have met many from different states and they are not as numerous as they should be.

With the advent of the Farm Bureau and other organizations that are financed sufficiently to support clerical work, the county agent, if he is the man he should be, should be able to obtain considerable help in this manner. But the agent whose work is poorly supported by the county or where there are no supporting agencies will certainly have to do lots of this work himself. And then it certainly does make you feel good if your wife can lend you a helping hand.

Speaking from nearly 12 years experience as county agent, I have always contended that the agent's efficiency could be increased many fold if he were provided with a good office and an efficient assistant. The office should be open six days a week, supplied with the best farm papers, telephone and a serviceable radio so that the assistant could keep in touch with the market news. In the vicinity of large cities the farmers' ability to get the market prices would be the means of large savings. Just recently the farmers and hucksters lost large sums of money due to a heavy drop in poultry and eggs. If the farmers were as interested in their business office as are the manufacturing and other industries the above described office would be a reality instead of a dream.

Very truly yours,

H. B. DERR, *County Agent,*
Fairfax, Va.

A Correction

Dear Jeff:—

My copy of the March number of BETTER CROPS has just arrived and I notice one very serious error in the article on raspberry anthracnose. This occurs in the second column on page 43, second paragraph, giving the formula for Bordeaux mixture, as 2–12–6. In looking over my copy of the article, I find that this error was made by my stenographer in the original copy and consequently is no fault of yours, and I should have caught it before it was sent out. I guess that she was thinking of fertilizer formulas instead of Bordeaux formulas. This should have been written 2–6–50 and if there is any way that it may be corrected I would appreciate it.

Very truly yours,

C. E. BAKER, *Ass't in Pomology,*
Purdue University, Lafayette, Ind.

Quality Pays,

Mr. Tobacco Grower!

Two ways are open to you to increase your profits from tobacco growing: Increase your yield per acre or improve the quality of your tobacco.

Since the best prices are received for high quality leaf, it is natural that growers should be most interested in improving their grades. When this can be done and the yield also increased, you have a combination that spells real profit.

And it can be done! The experience of many growers, confirmed by scientific experiments, proves that you can both increase your yield and improve your grade by the use of fertilizer containing plenty of sulfate of potash.

Take the case of Mr. L. B. Knott of Wake County, N. C., who raises Bright Flue-cured. Where he used no fertilizer he got 320 lbs. per acre of 15c tobacco; where he tried 1000 lbs. per acre of 8-4-0 (no potash) fertilizer he got 620 lbs. of 18c tobacco and on the plot where he applied 1000 lbs. of an 8-4-10 PNK fertilizer (containing sulfate of potash) he raised 760 lbs. of 23c. tobacco. Sulfate of potash costing only $6.00 brought him $63.20 more income per acre.

Sulfate of potash makes tobacco with a longer burn and better aroma and these are the qualities that command higher prices. Wherever there is a possibility of sand drown, you should use sulfate of potash magnesia which is a potash salt especially adapted to combat this disease.

The new edition of "BETTER TOBACCO" explains just how sulfate of potash should be used for quality results. You can secure a free copy by writing for it now.

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Legumes on the Dairy Farm

(*From page 12*)

It is needless to say that a cow cannot digest this much water unless it is provided frequently and at a reasonable temperature.

Mineral in large quantities is essential for a high-producing profitable cow. Milk contains large quantities of lime. A quart of milk contains as much lime as 33 pounds of beefsteak or 23 pounds of potatoes. That is one of the reasons why it is the best of all human foods. We use this lime in our own bodies to build teeth, bones, and muscles. This is the reason why most people who drink lots of milk from infancy have good teeth and strong bones and muscles.

But if a cow is to give us large quantities of a product which contains lots of lime, that lime must be provided in her rations. Which feeds contain lots of lime? We find the common feeds classified as follows:

Kind of Feed	Pounds of Digestible Lime per ton
Alfalfa Hay	39
Soy Bean Hay	34
Red Clover Hay	32
Corn Stover	12
Sorghum Hay	8
Blue Grass Hay	7
Wheat Straw	6
Timothy Hay	5

ALL the grain feeds are so low in mineral content as to be negligible. For that reason we must look to our roughages for mineral for our cows. From the above, we see that there is just one class of feeds that contain liberal amounts of lime. That is the legume hays. No cow can consume enough of the other feeds to produce large quantities of milk for any great length of time. It takes 43 pounds of timothy hay to provide enough lime to make a gallon of milk. Six and a half pounds of soy bean hay will provide the same amount of lime.

The cow may be able to produce large quantities of milk for a little while without legume hays. But unless a mineral mixture is substituted in some other form her production will soon drop because the cow does not have enough mineral in her feeds. Alfalfa, clover, soybeans, and cowpeas all supply lime in sufficient quantities to produce liberal quantities of milk. A cow should have all of one of these hays that she will clean up once a day throughout the entire feeding season. She should also have a liberal amount of clover in the pasture. On many farms in the Corn Belt, cows are held down in production, and profit, and much feed wasted because there is not enough mineral supplied with the ration. A herd cannot return the most profit unless a legume hay is provided in liberal quantities.

Not only does a lack of sufficient mineral reduce production and profits but it often also results in a run down diseased condition of the animal. Such a practice may even result in the cows dropping crippled, immature and even dead calves. Great numbers of the dairymen's troubles are directly traceable to this one fault. It is true that minerals may be purchased and added in the grain ration and, in the case of high-producing herds, it is well to do this even after legumes are fed. However, there is some question as to whether or not the cow gets as much good from minerals in that form as they do from those supplied in legumes.

ANOTHER feed constituent which is very deficient on the average corn belt farm is protein. Protein is used in our bodies to

build muscles, hair, skin, and bones. Milk contains large quantities of protein but in order to produce this product, the cow must be given feeds that contain a great deal of protein. A cow weighing a thousand pounds and producing three gallons of five per cent milk daily must have 2.4 pounds of protein and she must have about six-tenths of a pound of protein for each additional gallon of milk.

Some feeds contain large quantities of this protein while others contain very little of it. Corn stover contains 2.2 pounds of protein in each 100 pounds. In other words, a cow would have to eat 164 pounds of corn stover a day to produce five gallons of five per cent milk. Timothy hay, millet, oat straw, and the sorghums all contain about the same amounts of protein and a cow must eat just about the same amounts of them to produce milk as she must of corn stover. She may overcome this difficulty for a little while by taking protein from her own muscles and bones to make milk, but before long her milk will have to be reduced unless she is given one or more feeds which contain large quantities of protein. Some of the common feeds with the amount of protein per ton are as follows:

Feed	Pounds Protein Per Ton
Soy Bean Hay	234
Alfalfa Hay	212
Red Clover Hay	152
Oat Hay	90
Prairie Hay	80
Timothy Hay	60
Sorghum Fodder	56
Corn Stover	44
Soy Bean Oil Meal	794
Cottonseed Meal	740
Linseed Meal	604
Wheat Bran	250
Crushed Oats	194
Corn Chops	142

From the above it is seen at a glance that the legume hays including alfalfa, soybeans, and the clovers are the cheapest source of protein. The cow must have an abundance of this protein if she is to be a profitable producer and the cheapest way to get it is to raise a legume hay. Timothy hay averages a little over a ton to the acre in Missouri and produces about 66 pounds of protein to the acre. Soybeans average about one and a half tons to the acre and produce 351 pounds of protein to the acre.

WE must remember that some of these feeds that are low in protein contain a great deal of carbohydrates or starchy feed and we must not do away with them entirely. But we must raise more legume hay to supply this protein if we are to develop profitable herds. Where they will grow, we can raise protein cheaper with clover and alfalfa than with soybeans because we don't have to cultivate or seed so often. But on farms where it is not possible to grow clover and alfalfa successfully, it is always possible to grow soybeans. There is not a farm in the country that will not produce some legume hay and we must grow these legumes if we are to make maximum profits from our cows.

Real dairy prosperity in the corn belt does not depend upon a large expansion of the dairy industry. But it does require a thorough study of the fundamental principles of profitable production and the application of those principles. One of the most important of these and one which will spell millions of dollars in boosting dairy profits in the corn belt is the slogan offered by the Dairy Extension Service of the Missouri College of Agriculture —"An Acre of Legumes for Every Cow on the Farm."

Feeding the Bean Crop

(*From page 13*)

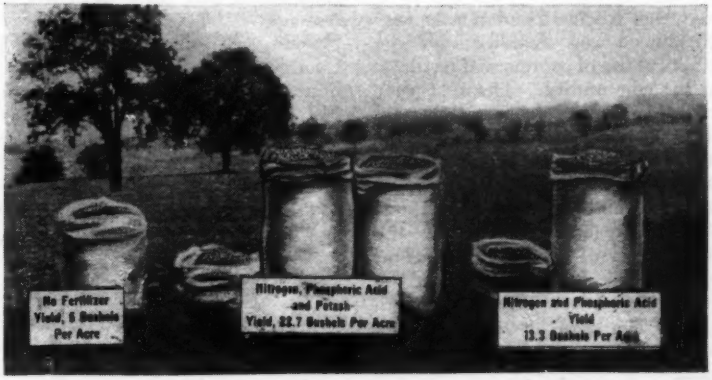
increase of 8.3 bushels over the unfertilized.

With the price of beans at $1.90 per bushel, the value of the crop from the untreated land was $9.50 per acre, compared with a $43.13 per acre crop from the completely fertilized soil. The increase in crop value due to the use of the fertilizer was $33.63 per acre. Where the potash was omitted from the mixture the increased crop value amounted to only $15.77. In other words, 10% of potash in the fertilizer more than doubled the increase in crop value, as compared with the increase produced by the incomplete fertilizer without potash and is thus responsible for an increase of 9.4 bushels per acre.

The cost of the complete mixture used by Mr. Hanna was $13.70 per acre. It returned $33.63 in increased crop value. Deducting the fertilizer cost from the value of the increased crop leaves a net profit of $19.93 per acre. Without the potash the fertilizer cost was $8.30, and returned $15.77 more per acre, leaving a profit of only $7.47 after paying the cost of the fertilizer.

From these figures it will be noted that the net returns from the complete mixture was more than twice as large as that resulting from the application of the incomplete fertilizer. The use of $5.40 worth of potash returned $12.46, an increase of 130% on the investment Such results indicate very clearly that a 10% potash mixture can be used with profit on the bean crop.

In considering Mr. Hanna's experience it is also well to note that the rate of application is more than three times that which is usually recommended for beans in Michigan. This, of course, greatly increased the cost of the fertilizer. Nevertheless, very good profits were secured from its use, which, after all, is the real test in the application of plant food mixtures.



Comparative Navy Bean Yields in Experiment of S. J. Hanna, Mason, Michigan.

No Fertilizer.	Complete Fertilizer with Potash. 200 lbs. Sulfate of Potash, 500 lbs. Acid Phosphate, 160 lbs. Blood.	Fertilizer Without Potash. 500 lbs. Acid Phosphate, 160 lbs. Blood.
Yield per acre 5 bus.	22.7 bus., increase 17.7 bus.	13.3 bus., increases 8.3 bus.

Welcome, Mr. Dunlap!

(*From page 14*)

uncles and most of his cousins, on both sides of the family, are or have been farmers and breeders and feeders of livestock. His great grandmother was a granddaughter of Benjamin Franklin.

After his graduation from the college of agriculture, Ohio State University, in 1895, Mr. Dunlap returned to his farm where he has been actively engaged most of the time with the exception of a few notable achievements in lines closely connected with agriculture. Shortly after college days he was chosen by the Ohio State Board of Agriculture as a lecturer for state farmers' institutes and spent his time for three winters in this work.

His father and mother became members of and active workers in the National Grange shortly after its organization in 1873 and he became associated with the organization as soon as he was old enough to join. He has been a member of the Farm Bureau since its organization and in other ways has been active in rural association activities.

It was Renick Dunlap who first introduced and demonstrated the practical use of commercial fertilizer in his community. The first year after graduating from college, by the proper use of commercial fertilizer, he raised more wheat on fifty acres than his father raised on one hundred and fifty acres without commercial fertilizer. He was the first friend of alfalfa in his community and gave his section of the state its first silo. Renick Dunlap always has been in the front rank of progressive agriculture.

THERE is every reason to believe that the practical livestock experience of the new Assistant Secretary will make him especially valuable to the U. S. D. A. in the administration of the Packers and Stockyards Act and other livestock activities. He has been an extensive feeder of cattle. He has either bought or sold livestock on the following markets: Chicago, Buffalo, Pittsburgh, Kansas City, East St. Louis, New Orleans, Jacksonville, Fla., Fort Worth, Cincinnati and Columbus, Ohio. But not all attention has been given to feeding cattle for market. He has been a breeder of pure bred shorthorn cattle and Duroc hogs and has judged horses, cattle and hogs at many fairs and expositions.

After serving in the Ohio state senate where he was chairman of the agricultural committee, Mr. Dunlap served two terms as state food and dairy commissioner. He has several notable accomplishments to his credit as a result of his work in this office dealing with misbranding and adulteration of good and drinks.

For a short period he was Secretary of the Ohio State Board of Agriculture and then resigned to manage a 60,000 acre ranch in Florida. At the time President Coolidge summoned him to Washington to assume his new position, Mr. Dunlap was managing his own Ohio farm as well as those of his father located in the same community.

The U. S. D. A. is fortunate in securing Renick Dunlap for its assistant chief in charge.

In our next number you will find articles by Albert Hansen, D. S. Burch, E. W. Howe, Jeff McDermid, and a number of other interesting writers. Don't miss this issue

The Relation of Sulfur to Soil Fertility

(*From page 23*)

Sulfur also gave increased yields on soil producing red clover.

The increased yield produced by sulfur is not so large with red clover as with alfalfa. It is perhaps even more significant since the untreated soil produces a good yield of two and one-third tons of clover, yet the flowers of sulfur increases this to four and three-fourths of a ton, an increase of over 200 percent! This is really a very marked increase for a soil treatment and the yield of red clover hay obtained is very large.

Treatment	Amount of Material Applied	Amount of Sulfur Present	Yield Per Acre
None	0	0	4680
Flowers of Sulfur	100	100	9480
Gypsum	590	100	7250
Superphosphate	820	100	7290

The effect of sulfur on red clover. Application and results recorded as pounds per acre.

In case of the alfalfa, while the increase produced was very marked, the actual yield from the sulfur treated plots was only two and one-half tons, which is only about 50 percent of the normal yield which might be expected on irrigated alfalfa land in a semi-arid region. Yet the yield of red clover hay from the sulfur treated soil is above the maximum for very productive soils even under humid conditions.

THE Oregon investigators have checked their results by the analysis of soils and crops and their results seem to indicate that sulfur is the limiting element of plant food on these basaltic soils and that the increase in yield has really been caused by sulfur as a plant food and that it is not due to indirect action to any extent. A conservative estimate by Powers indicates that there are at least 100,000 acres of alfalfa on semi-arid and arid land where the yield of alfalfa can be increased at least one ton per acre where the sulfur applied will not cost over $1.00 per acre.

The principal crops benefited by sulfur treatment have been alfalfa, red and alsike clover which have really responded in a very marked degree. In the case of wheat and potatoes slight increases have been obtained. The increased yield produced by sulfur upon the yield of potatoes is due in part at least to the effect of the sulfur as a fungicide upon the potato scab and other fungous diseases. Applications of sulfur have had practically no effect upon the yield of field peas, beans, corn, kale, rape or sunflowers.

Chemical analysis of the soil of the red hill regions in Oregon contain only from 150 to 400 pounds of sulfur per plowed surface of the soil and field experiments prove conclusively that sulfur applications increase the yield of grain and clover from 25 to 50 per cent and that the increased yield is larger from sulfur than from acid phosphate.

Investigations of the virgin and cropped soil indicated that the cropped soil of representative soil types now contains about 200 pounds of sulfur per plowed acre, while the virgin adjacent soil contains 300 pounds. This indicates a loss of 100 pounds of sulfur per

acre during 60 years of cultivation or only 1.6 pounds per acre per year.

Yet lysimeter studies indicate that from forty to forty-five pounds of sulfur are annually lost in the drainage water while only five or six pounds are annually added by the rainfall.

No explanation has been offered regarding the apparent discrepancy of the results. It is difficult to conceive how the initial supply of sulfur in the soil of 300 pounds could be reduced to 200 pounds after 60 years of cropping, representing a purely nominal consumption of only 1.6 pounds annually and yet over forty pounds removed in the drainage water with only six pounds added in the rainfall. Is there some other possible increase of sulfur supply?

It does seem fair to assume that with an annual removal of forty pounds in the drainage water and an initial supply of only 300 pounds per acre that it should all be removed in seven and one-half years by the drainage alone if the crop did not remove any at all. Yet crops have actually been growing on this soil for 60 years and two-thirds of the initial supply of sulfur is still present!

IN harmony with results elsewhere the Oregon data indicated that sulfur materials have a markedly stimulating effect on crop growth. Applied sulfur has produced visible results within two weeks after application. The applied sulfur aids nitrification immediately and is of value in stimulating the production of nitrates early in the season when nitrates are needed by the young growing plant and their supply has been largely depleted from the soil by the winter and spring rains.

The Oregon experiments also indicate that the continued use of flowers of sulfur produces an acid soil condition and that its long continued use will increase the need for lime materials for correction of the acidity produced. Other forms of sulfur bearing materials such as gypsum, acid phosphate, iron sulfate, are available for use, however, and perhaps will be found to be more economical to use.

THE results obtained from the use of sulfur materials on certain soil types in the Pacific Northwest are truly remarkable. It must be always remembered, however, that these results have been obtained on special soil types derived largely from volcanic material of basaltic origin. The climatic conditions, also, are arid or semi-arid. Such results obtained on special soils and under such climatic conditions should not be used as a guide for the use of sulfur under other soil and climatic conditions.

It seems quite certain that the basaltic regions of the Pacific Northwest offer a very fertile field for the profitable use of sulfur bearing materials as fertilizers. Basalt, the parent rock out of which the soils have largely been formed, contains only very limited amounts of sulfur.

Semi-arid soils derived from sedimentary deposits are rich in alkali sulfate and furthermore there are always such sulfates being added in irrigation waters which provide an abundance of sulfur for the plants' use.

The soils of the eastern and southern states receive an appreciable amount of sulfur in fertilizers, manures and in the precipitation which contains varying but still large amounts of sulfur because of the heavy coal consumption in these areas, so that the sulfur problem in the two regions is materially different.

How Successful Livestock Breeders Are Made

(*From page 5*)

he could have pride in seeing grow and develop, and unconsciously in the youthful mind is developing a knowledge and appreciation of blooded cattle not gained except in work with the animal itself.

"The boys' calves were well trained to show, and of still greater importance were growthy, well developed and in good show condition. The horns were polished, the hair clipped, and they were also blanketed, all of which showed that some preparation had been made for the show ring. A boy in the above respects may be a successful calf club member with a very poor individual, if the calf's care and attention has been what it should. In this work with its far-reaching significance Mr. W. F. Howell, county agent, has been the leader."

THE 1924 calf club show is the second show put on by the Lancaster calf club.

At the first show only 16 calves were shown, this year 30 calves were shown by the clubsters; and what's more they not only increased in number—but also improved in quality, condition, etc. The grand champion heifer last year was only senior champion this year, all of which indicates the progress being made. By next year some of the calves will have developed into mature cows, and will have produced a calf, which means that the youngsters will be getting a return on their investments.

Every boy got a prize. The prizes were as follows: Grand champion, a suit of clothes and a cream can. Junior champion, $7.50 in cash and a pair of milk scales. Senior champion same prizes. First in class, $2.50 in cash, pair of shoes and a subscription to a dairy journal. Other first in class winners received the same prizes. Seventy-four other prizes were

County Agent W. F. Howell giving a Lancaster calf club boy some pointers on fitting and showing his purebred calf.

awarded in addition to the ones mentioned above.

Woodrow Wilson won grand champion over all classes on Fern's Kitty 629546. He also won junior champion and first in the Junior Calf class. Furman Hammond won senior champion in the Senior Yearling class on Oxford's Robbie, 589755. Alger Poag won first in the Junior Yearling class on Selyn's Stockwell Beauty 611484. Earl Roberts won first in Senior Calf class on Brookhill's Buttercup 629545.

The best fitted and closest class was that of the junior calves and five entries were lined up. Competition was very keen between Fern's Kitty 629546, owned by Woodrow Wilson, and an un-named heifer owned by Elbert Faulkenberry. However, the former had the advantage in the length of rump and smoothness of tail setting, and showed a decided superiority in udder development and finally took the blue.

The first prize junior yearling and senior yearling heifers were next brought out to determine the senior champion. Last year's grand champion and this year's first-prize senior yearling, Oxford's Robbie, owned by Furman Hammond easily took champion honors due to her great depth of barrel, spring or rib and udder development.

In the afternoon a parade of the entire show was made through the business section of the thriving town of Lancaster; the boys led their heifers proudly through the streets which were lined with farmers and their wives, and business men of the town.

AN amusing incident which shows the intense interest that was manifested by the boys' fathers in the show is told by Mr. Williams, about Mr. Hammond, father of Furman Hammond, the club boy who carried away the grand champion honors last year.

According to Mr. Williams, Mr. Hammond was on hand the first day and was as much interested as any of the boys in everything that happened. However, at the end of the first day he told everybody good-by, and departed for his home, quite a distance away in the county, saying as he left that he was very sorry to leave, but that he had some important farm work that had to be finished the next day. But! Lo and behold, one of the first spectators to reach the show ring bright and early the next morning was Mr. Hammond.

When asked about it, he said: "Well, last night I got to thinking about the boys and the show, and who the prize-winners would be; and I just couldn't stay away—because I thought 'my boy' might win the Grand Champion Prize again this year."

The slogan for this year is "A Bigger and Better Calf Club Show for 1925."

What does this progress point to? It cannot be measured in terms of one year. It is paving the way for a profitable livestock industry in the South; and for successful breeders, who will make good use of the many advantages we have for raising livestock in the Sunny South. Progress has been made in this line in recent years, but it will take the inspiration and enthusiasm of the "Breeders of Tomorrow" to give it the necessary momentum.

Credo Omeletus

(From page 4)

radiance on the passing years; that to love, to breathe deeply and joyously is to live.

My philosophy, then, is a scrambled understanding of men and things, life and letters, cause and effect—a sort of *Credo Omeletus* which nourishes after a fashion.

Who is that knocking at that door?

The Springtime Outlook

(*From page 8*)

spell profit to the American producer. To rush ahead and expand production beyond these limits is simply to invite a return of the conditions of 1920-23.

IN the long run, it is to our interest to have Europe restored. For only prosperous countries can make a profitable market; only peoples whose high rate of productivity enables them to enjoy a high standard of living can create the sort of consumptive demand which our agricultural industry imperatively needs. It is well to reconsider from this point of view the significance of this year's price situation as it bears on the European problem. It has, of course, been a welcome relief to American wheat growers and others to receive higher prices for their products during the last few months. Such high prices, however, were due in large measure to scarcity abroad, particularly of breadstuffs. It has been estimated that the relatively poor crop yields of the current year have caused Great Britain alone to pay £64,000,000 more for her food bill than she otherwise would. The same situation of course applies also to France and Italy and the other importing countries on the Continent. But every one of these countries needs every pound or franc or lira that it can lay its hands on to pay its pressing debt obligations and to help as rapidly as may be to re-establish its industry and trade. The necessity for these extraordinary outlays for mere food this year has, by just so much, slowed down this important process of general economic restoration.

A certain gentleman who has attracted some attention by his predictions of world-wide weather conditions for a long period in advance is forecasting an extremely unfavorable crop year in Europe, and a somewhat unsatisfactory season in other important producing regions. This includes the promises of another poor crop in the United States. Should such a condition materialize, agricultural prices would, of course, maintain their present level or even advance somewhat. It would, however, be at the cost of a very serious interruption in the process of the world's economic reconstruction, and it is doubtful if the benefits even to our farmers would be as great as their ultimate losses. Should weather conditions be normal, it is to be expected that there would be some drop in prices, particularly of wheat, whose high price this year has stimulated a rather general increase of acreage.

Pending a solution of this riddle of the weather, the safest guess is for a national agricultural income next year, little, if any, less than that of the past season. The spring of 1925 should therefore invite the farmer "to make hay while the sun shines," but to be very cautious about expanding his activities or extending his commitments beyond the strictest limits which are necessitated by current operations. It is by no means impossible that we are about to pass the crest of domestic demand and to start on a general downward revision of values.

In next month's issue will appear the fourth and last of the prize editorials written by our readers.—"How Cost Account Records Help the Farmer," by R. W. Wallace.

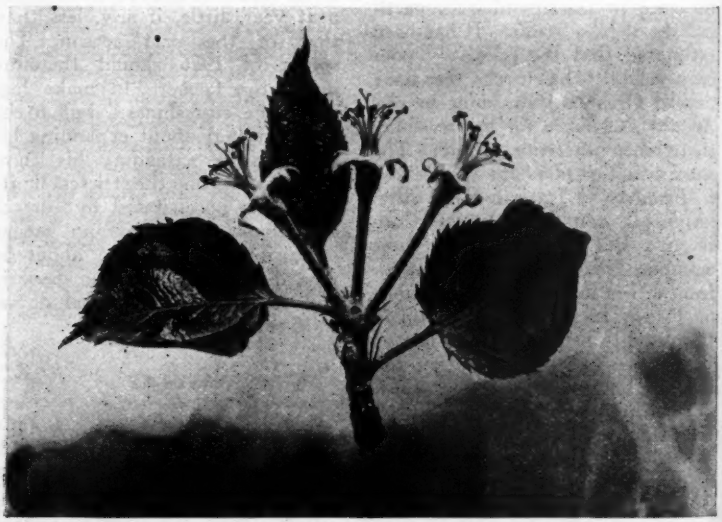
Spraying Failures

(*From page 10*)

time of application and the correct mixing of materials comes thoroughness of application. A spraying job haphazardly done is not efficient. A thorough application means that every particle of surface should be covered, and this should be the aim of the grower each time he puts on a spray. Just consider a moment what careless spraying means. Nearly any orchardist is familiar with San Jose scale and in most parts of the country he has to fight it constantly. He applies a caustic spray when the tree is dormant, to kill the scales upon the twigs and branches. Even if his job is well done, some scales are sure to get through unharmed, but if his job is carelessly done the number of scales surviving increases rapidly. A single scale insect has a possible progeny of 150 to 200 young each brood, and as there are several broods during the season, the number of new scales from those surviving the spray applications runs into the billions by the next fall. This is only one of many typical examples that might be cited as a result of careless spraying Can we afford to be careless?

There are many causes for lack of thoroughness of application, some of which the grower may be unconscious of. One common mistake is the use of too little spray material. A mature apple tree in leaf requires seven to ten gallons of material per application. From this figure, some idea of the amount required for trees of various sizes may be estimated. Use plenty of material and spray all parts of the tree uniformly and until the material begins to drip.

Faulty or inadequate equipment also tends to prevent thoroughness of application. A barrel sprayer that works properly is satisfactory for a small orchard, but for an orchard of more than 100 bearing trees a power sprayer is essential for greatest efficiency.



Apple blossom clusters at the right stage to apply the first codling moth spray. A few days later the calyx lobes will be closed. (Courtesy Purdue Exp. Sta.)

The best form of spray is a mist or fog applied at relatively high pressure. This is accomplished by forcing the material through a small hole in the nozzle disk. These holes gradually enlarge from wear, and the disks should be replaced frequently. Although they cost but a few cents a dozen, it is only too often that the same disk serves throughout the season and though the spray becomes coarser and coarser, no one seems to notice. This leads to needless waste and a poor distribution of materials.

Another common mistake along this line is the use of spray guns with low pressure and low capacity outfits. Spray guns were designed to apply a large amount of material in a short time and consequently require a high pressure to secure a mist-like spray. When two guns are used on a spray outfit whose normal capacity is two nozzles at 250 pounds pressure, the result is not only a poor job of spraying but it means that the outfit is working at a constant overload. This leads to breakdowns and expensive repairs.

Regardless of whether a hand pump or power sprayer is used, sufficient spray hose should be provided so that the operator can easily get at any portion of the tree. Each lead of hose for ground work should be at least thirty feet long and forty feet is a better length in most cases.

These are only a few of the possible reasons for spraying failures. They are very typical, however, and they indicate that most of the trouble can be overcome by the orchardist himself by giving greater attention to details and by better acquainting himself with the fundamental principles underlying the operations.

Concentrated Fertilizer for Economy

(*From page 18*)

	When Fertilizer had Been Applied in Row		Fertilizer Applied Broadcast	
	Conc.	Normal	Conc.	Normal
Tobacco, (average of 3 plots)	.....	.....	1,780.8 lbs.	1,701.6 lbs.
Sweet Corn, (average of 5 plots)	1,110*	1,079*	1,019*	.....
Potatoes, (average of 3 plots)	220.9 bus.	209.1 bus.	188.4 bus.	.....
Beets, (average of 5 plots)	24.2 tons	23.6 tons	23.8 tons	.....
Hay, (4 plots)	Actual yields were not taken, but the plot with 272.6 pounds of concentrated fertilizer appeared best at harvest.			

*Dozens of marketable ears.

izers. When thoroughly mixed with the soil, more thoroughly, in fact, than would be practical on the farm, a 4.6—10.7—4.1 chemical fertilizer without filler, applied at the rate of 7,868 pounds to the acre, produced satisfactory plants.

The Experiment Station's new evidence now seems to furnish a final answer to our doubting Thomases: "High analysis, concentrated fertilizers, such as the ones used, are safe to use when they are well mixed with the soil." There is much economy in them. "Although it is in the interest of national economy," Professor Beaumont points out, "for low grade materials not to be entirely displaced, an increasing confidence in concentrated fertilizers will give them a larger and larger bulk on the American fertilizer market."

Improving Tobacco Fertilizers

The growing of a profitable crop of tobacco depends largely on the use of proper fertilizers, and Mr. H. A. McGee, Tobacco Extension Specialist of the State College of Agriculture at Raleigh, North Carolina, has covered this matter very well in a circular just published, and called "Fertilizers for Tobacco." The circular states:

"The kind and quantity of fertilizer used" (on tobacco) "will determine largely the yield per acre, as well as the quality of the leaf grown. The fertilizer that gives the best results may cost more per ton, but the increased value of the crop grown will more than offset this additional cost.

"Commercial fertilizers are used for the purpose of supplying the plant food that is lacking in the soil. . . . The sources from which these plant food elements are derived are very important. Only high grade 16 per cent. acid phosphate is desirable for tobacco.

"Potash salts containing chlorine are objectionable. Chlorine is not a plant food in any sense of the word, it is only a stimulant. An excess of chlorine will retard rather than aid plant growth. It also renders the leaf unfit for smoking purposes, for which it is chiefly grown.

"Experimental tests have shown that Double Manure Salts (Magnesium - Potassium - Sulphate,) because of its magnesium content, and German high grade Sulphate of Potash (50 per cent) in connection with magnesium limestone are the best sources from which potash may be obtained.

"Another very important element of plant food for tobacco is magnesium. Recent tests have shown that it is relatively of as much importance as potash in keeping the plant healthy, and in helping to ward off leaf spot diseases. It is one of the essential elements of plant food."

In recent years scientific authorities have come to agree that the presence of chlorine in the tobacco leaf impairs the flavor and burning quality of the tobacco. Experiments conducted by the University of Ohio have shown conclusively that cigars made from tobacco fertilizer with sulphate, which is practically free of chlorine, are superior in burning quality, flavor and aroma to those fertilized with other forms of potash.

The Pennsylvania Legislature has taken cognizance of these developments by amending their Fertilizer Law on March 16th. The Amendment follows:

"No commercial fertilizer containing less than one per centum of ammonia or one per centum of available phosphoric acid, or one per centum water soluble potash nor any mixed fertilizer or mixture composed of two or more ingredients containing less than fourteen per centum of total plant food, namely, not less than one percentum of ammonia or one per centum of available phosphoric acid or one per centum of water soluble potash shall be sold, offered for sale or exposed for sale in this Commonwealth. No commercial fertilizer having the word 'tobacco' as part of its brand or trade name shall contain muriate of potash, manure salts, kainit or any other commercial potash combined with chlorine as chloride of potash. This amendment shall take effect and be in force January 1, 1926."

The above amendment was sponsored by James W. Kellogg, Assistant Director-Chief Chemist of the Pennsylvania Department of Agriculture.

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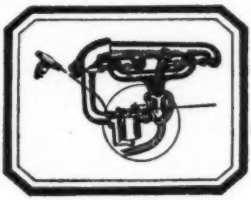

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BETTER PREPARATION — BETTER CROPS

One acre of ground properly prepared for seeding is worth two acres that is deficient in available plant food and that is full of clods and air spaces.

Preparation of the ideal seed bed involves an application of the proper fertilizer, if the soil is deficient in any of the available plant foods, and in properly discing, plowing and firming the soil until it is uniform from surface to subsoil.

Before plowing use the disc on the surface, cutting all trash and mixing it with the surface soil. This will eliminate clods and air pockets. Next plow the land, using a combined rolling coulter and jointer, so that all weed seeds and eggs and larvae of insects may be laid on the bottom of the furrow. Then, as a final preparation, use disc and pulverizer in pulverizing and firming the soil.

The result will be a seed bed that will be the greatest asset to the farm and to the farmer.

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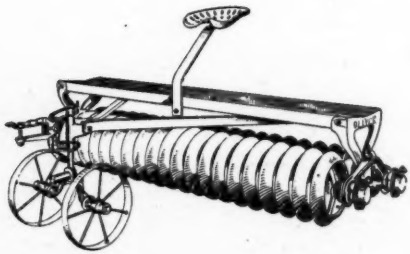
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